

CLAIMS

1. A steel member (10,40,70,100) for use in supporting structures and having reduced heat transfer characteristics as compared with solid web studs, and characterized by:
 - 5 a web (12,42,72,102,172) defining side edges and an axis;
 - a flange (14,44,74,104) on at least one side edge;
 - openings (18,46,76,112) through said web (12,42,72,102) at spaced intervals therealong, of predetermined size and profile, at least a side portion (32, 58, 78,84,120, 152) of said web (12,42,102,170) being
 - 10 removed from said opening (18,46,76,112) and remaining attached integrally to said web (12,42,72,102,172), and being bent away from said web (12,42,72,102, 172) along axes parallel to said web axis.
2. A steel member (10,40) as claimed in claim 1 including depressions (36,62, 182) formed in said web (12,42) at spaced intervals, and openings (38,64, 184)) formed in said depressions (36,62, 182) to reduce heat
- 15 transfer.
3. A steel member (10,40,70,100,170) as claimed in claim 1, wherein said side portion defines a channel shape extending along an axis parallel to said web axis.
- 20 4. A steel member (10) as claimed in claim 1 wherein said openings (18) are of a shape defining a linear side edge (22), and an arcuate side edge (20), said side portion (32) of said web (12) being integral with said linear side edge (22).
5. A steel member (10) as claimed in claim 1 wherein there are two said
- 25 flanges (14) one on each side of said web (12), being formed at normal to said web (12), and lips (16) formed along said flanges (14), normal to said flanges (14).
6. A steel member (10,40,70,100,170) as claimed in claim 1 said openings (18,46,76,112) are arranged in an alternating orientation and define
- 30 between them struts (34,52,) extending diagonally across said member (10,40,70,100,170).

7. A steel member (10,40,70,100,170) as claimed in claim 6 including openings (38,64, 182) formed in said web (12,42,72,102,172) at opposite ends of each said strut to restrict heat transfer through said member .
- 5 8. A steel member (40,70,100) as claimed in claim 1 wherein said openings (46,76,112) have a first longer linear side (48,116), and a second shorter linear side (50,118) opposite to and parallel to one another.
9. A steel member (40,70,100) as claimed in claim 8 including diagonal sides extending between said linear sides , defining a generally quadrilateral shape.
- 10 10. A steel member (40,70,100) as claimed in claim 9 wherein said openings (46,76,112) are arranged in an alternating orientation, and wherein said diagonal sides define struts therebetween extending across said member (40,70,100).
- 15 11. A steel member (10,40) as claimed in claim 9 including slots (38,64) formed in said web (12,42) adjacent the ends of each said strut (34,52) whereby to restrict heat transfer.
- 20 12. A steel member (40,70,100) as claimed in claim 10 wherein said flanges (44,74,104) are formed at an angle to said web (42,72,102) and including a planar wall (106) extending from said flanges (44,74,104) normal to said web (42,72,102), a bracing wall (108) formed on said planar wall and lips (54,80,110) formed along said bracing wall bent to form a channel shape.
- 25 13. A steel member (100) as claimed in claim 12 including side portions integrally formed of portions of said web (102) removed from said openings (112), and bent outwardly towards said lips (110) of said bracing walls (108), an edge of said side portions being captured in said lips (110) whereby to form generally triangular shaped tubes .
- 30 14. A steel member (10,40) as claimed in claim 13 including openings (38,64) formed in said web (12,42) along said flanges (14,44) to reduce heat transfer.
15. A steel member (70) as claimed in claim 12 wherein side portions are removed from the opening (76) but remain integrally attached to said web

(72), said side portions, on one side of said web (72) being angled at an angle to said web (72) diverging from said flanges (82), and an embedment lip (88) formed along said side portions for embedment in a concrete panel.

- 5 16. A steel member (70) as claimed in claim 15 including a further embedment lip (90) formed on said flange (84) on said one side of said web (72), whereby to provide further embedment in a said concrete panel.
- 10 17. A steel member (100) as claimed in claim 10 wherein said flanges (104) are formed at an angle to said web (102) and including a planar wall (106) extending from said flanges (104) normal to said web (102), and a bracing wall (108) extending integrally from said planar wall (106).
- 15 18. A steel member (100) as claimed in claim 17 including side portions formed by portions of sheet metal removed from said openings (112) and remaining attached integrally to said web (102), said side portions being interengaged with said bracing walls (108), to define a generally triangular shaped tube extending along each side of said member (100).
- 20 19. A steel member (100) as claimed in claim 18 wherein said bracing walls (108) extend from said planar walls (106) at an angle complementary to said flanges (104), whereby said bracing walls (108) lie against said web (102) at their edge, and capture lips (110) bent outwardly from said bracing walls, and captured in said side portions.
- 25 20. A steel member (100) as claimed in claim 19 wherein said side portions along said longer linear sides (116) are longer, and wherein said side portions along said shorter linear sides (118) are shorter, and wherein said bracing walls (108) and said lips (110) on said walls (108), extend continuously along the web (102) parallel to the axis of the web (102).

21. A steel member (132) as claimed in claim 1 wherein said web (134) defines a linear side edge (146) and a zig zag side edge (156,158), and a web axis;
a flange (136) on linear side edge (146);
5 openings (144) through said web (134) at spaced intervals therealong, of predetermined size and profile, at least a side portion of said web (134) removed from said opening (144) remaining attached integrally to said web (134); and defining bends being formed along axes parallel to said web axis.
- 10 22. A steel member (132) as claimed in claim 21 wherein said flange (136) connects with a planar wall (138) normal to said web (134), and including a bracing wall (140) integral with said planar wall (138) and bent at an angle complementary to said flange (136).
- 15 23. A steel member (132) as claimed in claim 22 including a fold portion (146) engaging said bracing wall (140)
24. A composite member (130) formed of two steel members (132) as claimed in claim 21, said two members (132) being attached to one another to form a composite member (130).
- 20 25. A steel member (132) as claimed in claim 24 wherein said zig zag edge (156,158) defines peaks (156) and valleys (158) and wherein said two members (132) are connected at their peaks (156) and are secured to one another at said peaks (156), said valleys (158) in said two members (132) registering with one another and defining openings through said composite member (130).

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26. A method of making steel member (10,40,70,100,132) having a web (12,42,72,102,134) and side edges, and a flange (14,44,74,104,136) along at least one said side edge, and openings (18,46,76,112,144) through said web (12,42,72,102,134), said method characterized by the steps of;
- 5 forming said openings (14,44,74,104,136) in said web (12,42,72,102,134) at spaced intervals therealong, with one side of said opening (14,44,74,104,136) leaving a side portion of metal attached to said web (12,42,72,102,134);
- 10 forming said edge flange (14,44,74,104,136) along said at least one side edge of said web (12,42,72,102,134), and, forming said side portion out of the plane of said web (12,42,72,102,134) by bending said side portion along bend lines parallel to the web axis.
27. A method of making steel member (100) as claimed in claim 26 and including the step of forming a planar wall (106) on said flange (104) normal to said web (102),
- 15 forming a capture lip (110) on said planar wall (106), and, bending said side portion over said capture lip (110).
28. A method of making steel member (10) as claimed in claim 26 and including the step of forming struts (34) extending across said web (12) between said openings (18) and forming slots (38) in said web (12) adjacent each end of each strut (34).
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29. A method of making steel member (40,70,100) as claimed in claim 26 and including the steps of forming openings (46,76,112) in said web (42,72,102) of generally quadrilateral shape and defining a longer linear side (48,116) and a shorter linear side (50,118), and said side portions of said web (42,72,102) remaining attached thereto and extending integrally from said first and said second linear side (48,50,116,118).
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30. A method of making steel member (40,70,100) as claimed in claim 29 and including the steps of forming both said side portions over portions of adjacent flanges (44,74,104).
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31. A method of making steel member (40,70,100) as claimed in claim 29 and including the steps of forming said side portions at an angle to said web (42,72,102) diverging from said flanges (44,74,104), and capturing an edge of each side portion in portions of said flanges (44,74,104).
- 5 32. A method of making steel member (132) as claimed in claim 26 wherein one side edge (146) of said web (134) is linear and the other side edge (156,158) is zig zag.
33. A method of making steel member (132) as claimed in claim 32 and including the steps of forming said at least one edge flange (136) along
10 said linear side edge (146), and forming rim flanges (160) along said zig zag edge (156,158), and forming openings (144) through said web (134).
34. A method of making steel member (132) as claimed in claim 32 and including the steps of forming side portions of said web (134) remaining attached thereto and bending said side portions out of the plane of said
15 web (134), and folding said side portions around portions of said edge flanges (136) on said linear side (146) of said web (134).
35. A method of making steel member (132) as claimed in claim 26 wherein said zig zag edge (156,158) defines peaks (156) and valleys (158), and including the step of joining two said members (132) together with their
20 peaks (156) in contact with one another to form a composite member (130).
36. A steel stud as claimed in claim 1 for embedment in concrete and including an angled flange (196) formed with openings (198) for flow of concrete therethrough, and a locking strip (200) formed along said angled
25 flange.